

## CLAIMS

We claim:

1. A method for identifying optimal mapping of logical links to the physical topology of a network, the method comprising:

obtaining one or more mapping options for mapping multiple logical links between two or more pairs of network nodes onto physical paths that are at least relatively disjoint;

obtaining a priority order of the network node pairs; and

correlating the mapping options with the priority order of the network nodes to identify optimal mapping of logical links to the physical topology of a network.

2. The method of claim 1, further comprising:

obtaining the availability of wavelengths in the network.

3. The method of claim 2, further comprising:

correlating the mapping options with the maximum time delay, and the wavelength availability to identify optimal mapping of logical links to the physical topology of a network.

4. The method of claim 2, further comprising:

obtaining the maximum time delay allowed between each network node pair.

5. The method of claim 4, further comprising:

obtaining the relative time delay allowed between two or more physical paths.

6. The method of claim 5 further comprising:

correlating the mapping options with maximum time delay, the relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network.

7. The method of claim 1, wherein the correlation is performed using an integer linear program.

8. The method of claim 1, wherein the correlation is performed using a Tabu search methodology.

9. The method of claim 1, wherein the correlation is performed to identify the optimal mapping for a large Internet network backbone.

10. One or more computer readable media having computer-executable instructions for performing the method recited in claim 1.

11. A computer system for identifying optimal mapping of logical links onto the physical topology of a network, the system comprising:

a practical constraint module comprising a mapping option sub-module for obtaining mapping options for multiple logical links between two or more pairs of network nodes onto physical paths that are at least relatively disjoint and network node priority sub-module for obtaining a priority order of the network nodes; and

a correlation module coupled with the practical constraint module for correlating the mapping options with the network node priority order to identify optimal mapping of logical links to the physical topology of a network.

12. The computer system of claim 11, wherein the practical constraint module further comprises:

a wavelength submodule for obtaining wavelength availability in a network.

13. The computer system of claim 12, wherein the correlation module correlates the mapping options with the network node priority and wavelength availability.

14. A system for identifying optimal mapping of logical links to the physical topology of a network, the system comprising:

means for obtaining one or more mapping options for mapping multiple logical links between two or more pairs of network nodes onto physical paths that are at least relatively disjoint;

means for obtaining a priority order of the network node pairs; and

means for correlating the mapping options with the priority order of the network nodes to identify optimal mapping of logical links to the physical topology of a network.

15. The system of claim 14, further comprising:

means for obtaining the availability of wavelengths in the network.

16. The system of claim 15, further comprising:

means for correlating the mapping options with the maximum time delay, the relative time delay and the wavelength availability to identify optimal mapping of logical links to the physical topology of a network